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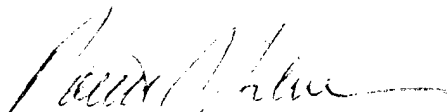
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From: Director, Office of Naval Research, Seattle Regional Office, 1107 NE 45th St., Suite 350,
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To: Defense Technical Center, Attn: P. Mawby, 8725 John J. Kingman Rd., Suite 0944,
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Subj: RETURNED GRANTEE/CONTRACTOR TECHNICAL REPORTS

1. This confirms our conversations of 27 Feb 97 and 11 Jul 97. Enclosed are a number of technical reports which were returned to our agency for lack of clear distribution availability statement. This confirms that all reports are unclassified and are "APPROVED FOR PUBLIC RELEASE" with no restrictions.

2. Please contact me if you require additional information. My e-mail is silverr@onr.navy.mil and my phone is (206) 625-3196.


ROBERT J. SILVERMAN

Final Technical Report -- N00014-92-J-1027

Saiyed I. Ahmed, Principal Investigator

Distribution: (4/5/96)

Dr. Bernard J. Zahuranec, Scientific Officer (3)

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2 April 1996

Dr Bernard J. Zahuranec
Program Officer, Code OOST
Office of Naval Research
800 N Quincy St
Arlington, VA 22217-5000

REF: Final Technical Report — ONR Grant #N00014-92-J-1027

Dear Dr Zahuranec:

It is my pleasure to report that since 1993 I have had the honour of functioning as the U.S. Coordinator of the ONR-funded NASEER Project, the task of which has been to study and evaluate the impact of the monsoonal physical forcing factors on the biological and chemical parameters in the northern Arabian Sea. The long-range objective of such studies has been to understand whether the Arabian Sea is primarily a sink or source of the greenhouse gas CO₂ which may have implications for modeling long-term global climatic changes. Since NASEER is a cooperative project between the U.S. and Pakistan on the oceanography of the Arabian Sea, the primary Pakistani institution involved with the conduct of the research has been the National Institute of Oceanography, with ancillary help from University of Karachi scientists and collaboration with those U.S. marine scientists interested in participating in this project.

Because NIO does not yet own a dedicated oceanographic vessel, our most difficult task in carrying out our mission in the northern Arabian Sea has been the chartering or leasing of a vessel suitable for oceanographic research. The need for a stable platform in the Arabian Sea where during the summer monsoon wind speeds can be in excess of 21 knots is quite obvious. Despite repeated efforts, arrangements made during the first few cruises with chartering of commercial vessels have proven to be *not* suitable. However, during the latter part of 1993, arrangements were made with the Baharia Foundation of Pakistan for the leasing of BEHR PAIMA, which is a dedicated hydrographic vessel suitable for oceanographic work, and since then, a regular program of seasonal studies is being implemented. A paper on the NASEER Project has been published in the U.S. JGOFS Newsletter, December 1993 issue, entitled "Pakistan and U.S. Conduct Cooperative Research Program in North Arabian Sea" by Ahmed et al., which describes the program in a fairly detailed manner. Since then, several other papers on NASEER-related research have also been published by several NIO scientists; therefore, I would not make further comments on this project except to mention that as a cooperative project, NASEER has been quite successful. As far as my own contributions resulting from this ONR funding are concerned, I am glad to report that a total of seven papers have been presented and/or published:

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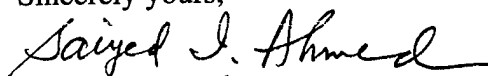
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- (1) Ahmed, S.I., B.L. Williams and V. Johnson. 1992. Microbial populations isolated from the sediments of an anoxic fjord: An examination of fermentative bacteria involved in organic matter diagenesis in Saanich Inlet, B.C., Canada. *Marine Microb. Food Webs* 6: 133-148.
- (2) Ahmed, S.I., S. Amjad and S.H. Niaz Rizvi. 1993. Pakistan and U.S. conduct cooperative research program in North Arabian Sea. *U.S. JGOFS News* 5: 13-14.
- (3) Amjad, S., S.H.N. Rizvi and S.I. Ahmed. 1993. Impact of monsoonal reversal on the oceanography of the northwestern Arabian Sea: The "NASEER" Project. TOS meeting, Seattle, WA, April 1993.
- (4) Ahmed, S.I., S. Amjad, M. Saleem, N. Khan, N. Bano, M. Nisa, J. Bacquer, A. Ali and F. Azam. 1993. Preliminary studies on size-fractionated primary productivity and foodweb structure in the northern Arabian Sea in response to physical forcing factors. PAK-US Conference on Arabian Sea Living Marine Resources and the Environment, June 1993.
- (5) Ahmed, S.I., M. Saleem, N. Khan and A. Ali. 1995. Changes in biomass and size-fractionated primary productivity in the northern Arabian Sea in response to winter and summer monsoons. In Thompson, M.F. and N.M. Tirmizi (eds.), *The Arabian Sea: Living Marine Resources and the Environment*: 479-495. AIBS, Washington. Vanguard Books, Lahore, Pakistan . 730p.
- (6) Ahmed, S.I. 1995. Recent trends in oceanographic research. Keynote address. In Thompson, M.F. and N.M. Tirmizi (eds.), *The Arabian Sea: Living Marine Resources and the Environment*: 19-24. AIB, Washington. Vanguard Books, Lahore, Pakistan. 730p.
- (7) Kristensen, E., S.I. Ahmed and A.H. Devol (1995) Aerobic and anaerobic decomposition of organic matter in marine sediment, which is fastest? *Limnology and Oceanography* 40: 1430-1437.

The funds available in this grant were fully expended by 31 December 1995.

With many thanks for continued ONR support and with best wishes and regards, I remain,

Sincerely yours,



Saiyed I. Ahmed

Professor

U.S. Coordinator "NASEER"